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Secondary Hemorrhage After Total Laparoscopic Hysterectomy

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ABSTRACT

Background and Objectives: The purpose of this study is to estimate the cumulative incidence, patient characteristics, and potential risk factors for secondary hemorrhage after total laparoscopic hysterectomy.

Methods: All women who underwent total laparoscopic hysterectomy at Paul's Hospital between January 2004 and April 2012 were included in the study. Patients who had bleeding per vaginam between 24 hours and 6 weeks after primary surgery were included in the analysis.

Results: A total of 1613 patients underwent total laparoscopic hysterectomy during the study period, and 21 patients had secondary hemorrhage after hysterectomy. The overall cumulative incidence of secondary hemorrhage after total laparoscopic hysterectomy was 1.3%. The mean size of the uterus was 541.4 g in the secondary hemorrhage group and 318.9 g in patients without hemorrhage, which was statistically significant. The median time interval between hysterectomy and secondary hemorrhage was 13 days. Packing was sufficient to control the bleeding in 13 patients, and 6 patients required vault suturing. Laparoscopic coagulation of the uterine artery was performed in 1 patient. Uterine artery embolization was performed twice in 1 patient to control the bleeding.

Conclusions: Our data suggest that secondary hemorrhage is rare but may occur more often after total laparoscopic hysterectomy than after other hysterectomy approaches. Whether it is related to the application of thermal energy to tissues, which causes more tissue necrosis and devascularization than sharp culdotomy in abdominal and vaginal hysterectomies, is not clear. A large uterus size, excessive use of an energy source for the uterine artery, and culdotomy may play a role.

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INTRODUCTION

Secondary hemorrhage after hysterectomy is a rare but life-threatening complication that may require prompt medical and surgical intervention. Although the overall incidence of secondary hemorrhage is low, gynecologists do come across secondary hemorrhage of varying degrees of severity.[1] A few studies have shown the overall incidence of hemorrhage to be 0.2% and 2% after hysterectomy, which includes reactionary and secondary hemorrhage.[1–4] Our center has been performing laparoscopic hysterectomies since 1994, and we have encountered 1 or 2 cases of secondary hemorrhage per year in the second or third postoperative week that necessitates hospitalization and active treatment. We believe this incidence is higher after laparoscopic hysterectomy than after the other modes of hysterectomy.

The purpose of this study is to estimate the cumulative incidence of secondary hemorrhage resulting after laparoscopic hysterectomy. The second goals of this study are to describe the patient characteristics of those with secondary hemorrhage after hysterectomy and to identify the potential risk factors.

MATERIALS AND METHODS

All women who underwent total laparoscopic hysterectomy (TLH) performed by the first author at Paul's Hospital between January 2004 and April 2012 were included in this study. The medical records of the patients were reviewed to ensure that those patients who had bleeding per vaginam between 24 hours and 6 weeks after primary surgery and those requiring some intervention in the form of vaginal packing, vault suturing, laparoscopy, laparotomy, or embolization procedures were included in the analysis.

The institutional review board approved the data collection, aggregation, and analysis for this project. The following data were studied: age, parity, body mass index, indication for hysterectomy, size of uterus, details of surgical

Table 1.
Overall and Annual Cumulative Incidence of Secondary Hemorrhage After TLH

	2004	2005	2006	2007	2008	2009	2010	2011	January to April 2012	Total
No. with secondary hemorrhage	3	3	3	2	3	4	2	1	0	21
Total No. with TLH	127	193	248	203	143	208	193	209	89	1613
Cumulative incidence of secondary hemorrhage (%)	2.36	1.55	1.21	0.99	2.10	1.92	1.04	0.48	0.00	1.30

procedure, administration of antibiotics, time interval between hysterectomy and secondary hemorrhage presenting symptoms, hemodynamic status, and type of intervention needed to manage secondary hemorrhage.

TLH procedures were performed by dissecting the entire uterus laparoscopically; the uterine arteries were coagulated with a bipolar method or Enseal (Ethicon Endo-Surgery, Somerville, New Jersey); and laparoscopic culdotomy was performed with a monopolar hook with a 60-W cutting current at a level above the uterosacral attachment, preserving the uterosacral arch. Additional hemostasis was achieved with bipolar forceps. Specimens were removed vaginally after morcellation with a knife and without undue traction. The vaginal cuff was closed vaginally in a continuous nonlocking fashion vertically or in transverse fashion with No. 1-0 Polysorb (Covidien, Mansfield, MA, USA), Vicryl (Ethicon Endo-Surgery), or Dexon (Covidien, Mansfield, MA, USA). The vault was inspected laparoscopically at the end of the procedure and complete hemostasis ensured. All patients received 2 doses of antibiotics, the first dose intraoperatively and the second dose postoperatively, and they were discharged on postoperative day 1. Statistical analyses were performed with the χ^2 test, Kruskal-Wallis test, and analysis of variance. $P < .05$ was considered statistically significant.

RESULTS

A total of 1613 patients underwent TLH during the study period, and 21 patients had secondary hemorrhage after hysterectomy. The overall cumulative incidence of secondary hemorrhage after TLH was 1.3%. The annual cumulative incidence of secondary hemorrhage after TLH was also analyzed **(Table 1)**. Patient characteristics and clinical presentation were reviewed **(Table 2)**.

The indications for the hysterectomies are shown in **Table 3**, with the main indication being myoma uterus in both groups. Surgical details of patients are described in **Table 4**. The mean size of the uterus was 541.4 g in the secondary hemorrhage group and 318.9 g in patients without hemorrhage, which was statistically significant. The mean duration of surgery was 100.7 minutes and the mean blood loss was 266.7 mL in patients with secondary hemorrhage, which were greater than those in the patients without hemorrhage but not statistically significant. In patients with hemorrhage after TLH, a bipolar cautery was used in 14 cases and Enseal was used to coagulate the uterine pedicle in the remaining 7 patients. The vagina was closed transversely in 10 patients and vertically in 11 patients. The suture material used for vault suturing was Dexon, Vicryl, and Polysorb in 6, 8, and 7 patients, respectively, in the group with secondary hemorrhage. The median time interval between hysterectomy and secondary hemorrhage was 13 days.

Table 2.
Demographic Characteristics of Patients With Secondary Hemorrhage After Total Laparoscopic Hysterectomy

Variable	Patients With Hemorrhage (n = 21)	Patients Without Hemorrhage (n = 1592)	*P* Value
Age (mean ± SD) (y)	45.8 ± 4.5	46.3 ± 6.1	.7
Parity			
0	0	66 (4.1%)	
1	4 (19%)	284 (17.8%)	.5
≥2	17 (81%)	1236 (77.6%)	
Mode of delivery			
Vaginal	15 (71.4%)	1101 (69.2%)	.5
Cesarean	6 (28.6%)	415 (26.1%)	
BMI[a] (mean ± SD)	27.22 ± 3.7	27.02 ± 4.7	.8

[a]BMI = body mass index.

All patients presented with bleeding per vaginam of varying degrees **(Table 5)**. The amount of bleeding was mild in 10 cases and severe (>200 mL) in 11 cases. Along with bleeding, 2 patients had a fever and 1 patient had a cough. Three patients were in a state of hypovolemic shock at the time of hospitalization. Blood transfusions were needed in 5 patients.

Table 3.
Indications for Hysterectomy

	Hemorrhage Group	Nonhemorrhage Group
Indication	15 (71.4%)	1000 (62.8%)
Myoma		
Cervical pathology	0	14 (0.86%)
Myoma and endometriosis	2 (9.5%)	112 (7.0%)
Myoma and ovarian pathology	1 (4.8%)	28 (1.8%)
Adenomyosis	1 (4.8%)	163 (10.3%)
Dysfunctional Uterine Bleeding	1 (4.8%)	76 (4.8%)
Endometrial hyperplasia	0	20 (1.3%)
Ovarian pathology	0	52 (3.3%)
Postmenopausal bleeding	1 (4.8%)	64 (4.0%)
Uterine prolapse	0	7 (0.4%)
Total	21	1592

Table 4.
Surgical Details

	Hemorrhage Group (n = 21)	Nonhemorrhage Group (n = 1592)	*P* Value
Previous laparotomy			
No	16	1147	
Yes	05	445	.5
Energy source of uterine artery			
Bipolar	14	900	
Enseal	7	692	.4
Technique of vault suturing			
Transverse	11	771	
Vertical	10	821	.7
Type of suture material			
Dexon	6	322	
Vicryl	8	824	.43
Polysorb	7	446	
Duration of surgery (mean ± SD) (min)	100.7 ± 24.5	85.2 ± 38.6	.07
Estimated blood loss during surgery (mean ± SD) (mL)	266.7 ± 92.6	228.5 ± 125.4	.2
Weight of uterus (mean ± SD) (g)	541.4 ± 444.5	318.9 ± 258.4	.04[a]

[a]Statistically significant.

For the management of secondary hemorrhage, vaginal packing was sufficient to control bleeding in 13 patients whereas 6 patients required vault suturing. Laparoscopic coagulation of the uterine artery was performed in 1 patient, in whom the source of bleeding could not be identified vaginally. Uterine artery embolization was performed twice in 1 patient to control the bleeding. Resumption of sexual intercourse was not found in any of these patients because all of them presented within 6 weeks after surgery. The period of abstinence advised after TLH was 6 to 8 weeks.

DISCUSSION

Hemorrhage after hysterectomy is a rare but life-threatening complication.[1] In our study, 21 patients (1.3%) had secondary hemorrhage among 1613 hysterectomies. There are few published reports of the incidence of secondary hemorrhage after hysterectomy. Holub and Jabor[4] reported 2 cases (0.17%) of secondary hemorrhage in their series of 1167 patients with laparoscopic hysterectomy and vaginal hysterectomy. Wilke et al[1] reported an incidence of secondary hemorrhage of 0.23% after vaginal hysterectomy and laparoscopic hysterectomy. In an earlier study by Bhattacharya et al,[3] the incidence of secondary hemorrhage was 0.45% after vaginal hysterectomies.

The cumulative incidence of secondary hemorrhage is higher in our study than the incidence in the previous studies. An infrequent occurrence of secondary hemorrhage, failure to report to the center where hysterectomy was performed, or nondocumentation of cases may be the possible reason for the lower incidences reported in the literature. Possible factors that may play a role in secondary hemorrhage are vaginal vault infection, vault hematoma, poor surgical technique including excessive thermal injury by electrocoagulation, and early resumption of physical activity. Another possible reason for the higher rate of secondary hemorrhage in our study is our technique of preserving the arch of the uterosacral ligaments, which includes more cervical tissue and may have a greater chance of bleeding.

TLH is a feasible and safe technique in cases of enlarged uteri, which permits avoidance of laparotomy with evident benefits for the patients.[5] The size of the uterus was significantly higher among patients in the secondary hem-

Table 5.
Clinical Presentation and Treatment of Secondary Hemorrhage

Symptoms/Treatment	No. of Patients With Secondary Hemorrhage
Associated symptoms	
Fever	2
Cough	1
Severity of hemorrhage	
Mild ≤200 mL	10
Profuse >200 mL	11
Hemodynamic status	
Stable	20
Shock	3
Treatment	
Blood transfusion	5
Vaginal packing	13
Vault suturing	6
Laparoscopic coagulation of uterine artery	1
Uterine artery embolization	1

orrhage group. High vascularity and large-sized vessels may be responsible for the increased incidence of secondary hemorrhage in large-sized uteri.

The source of bleeding in secondary hemorrhage can be from the uterine vessels or descending cervical/vaginal vessels. Because the source of bleeding was from the uterine vessels in only 2 cases in our study, it appears that the use of an energy source for the uterine vessels is unlikely to increase the incidence of secondary hemorrhage after TLH. Occasionally, uterine artery pseudoaneurysm can cause delayed heavy vaginal bleeding after laparoscopic hysterectomy.[6]

Monopolar energy was used for culdotomy in all patients in the TLH group. The use of thermal energy may result in increased tissue damage to the vaginal cuff.[2] Vault bleeding was responsible for secondary hemorrhage in 19 of 21 cases. Hence the use of an energy source for the vault may be responsible for the higher incidence of secondary hemorrhage after TLH. It may be advisable to minimize the use of thermal energy so that the tissue is not overdesiccated.[2]

The technique of vaginal vault closure may also contribute to the occurrence of secondary hemorrhage. Reich[7] recommends laparoscopic vaginal vault closure with McCall culdeplasty for good support of the vaginal vault. The first suture brings the uterosacral ligaments, cardinal ligament, and posterior vaginal fascia together across the midline. The rest of the vagina and overlying pubocervicovesicular fascia are closed vertically with 1 or 2 No. 0 Vicryl interrupted sutures. However, in our study the vaginal cuff was closed vaginally in a continuous nonlocking fashion vertically or in transverse fashion with No. 1-0 Polysorb, Vicryl, or Dexon. The vault was inspected laparoscopically at the end of the procedure, and complete hemostasis was ensured. In a study by Uccella et al,[6] the rate of postoperative vaginal bleeding was lower after transvaginal cuff closure than after laparoscopic cuff suturing. There was less need for vaginal cuff resuturing when transvaginal closure was performed compared with laparoscopic closure.

The time interval between hysterectomy and the onset of secondary hemorrhage ranged between 3 and 22 days. For the few reported cases in the literature, the time interval varied from 3 to 18 days.[1,2,4]

In our study we have used vaginal packing to control secondary hemorrhage occurring from the vaginal cuff. Vaginal packing should be tight enough to stop the bleeding, although it is unpleasant for the patient without anesthesia. In the initial few cases we examined the patient while under short-lasting general anesthesia after packing to determine whether the bleeding had completely stopped. Later, we found it unnecessary if the pack was dry and discontinued this practice. The pack was usually removed after 24 hours. Most patients could be treated with vaginal packing alone, and this finding implies that the source of bleeding could be from the vaginal cuff. Any active bleeding that cannot be controlled by packing can be secured with suture. In another study the vaginal cuff bleeding in 3 cases was managed by vaginal repair and packing without laparoscopic re-exploration or transfusion.[4] Laparoscopic surgery in patients with postoperative bleeding after hysterectomy is feasible and may be recommended if the source of bleeding cannot be identified by vaginal examination or if the symptoms indicate that the source of bleeding is intra-abdominal.[4] Laparoscopy provides good magnification, which allows closer inspection, as well as a more precise use of bipolar coagulation or suturing for management of hemorrhage.[1] In our study, one patient underwent laparoscopic coagulation of the uterine artery after TLH. Emergency therapeutic arterial embolization is a safe and effective minimally invasive procedure for patients in whom postoperative hemorrhage develops after gynecologic laparoscopic surgery.[9] In our study, one patient with secondary hemorrhage in the TLH group underwent uterine artery embolization twice. Vaginal vault

dehiscence is one of the rare complications after hysterectomy.[10] In our study, we did not come across any cases of vaginal vault dehiscence. Minimal use of diathermy on the vault and the technique of vaginal suturing, which included the pericervical tissue, may be the reason for the nonoccurrence of vault dehiscence.

The exact cause for increased incidence of secondary hemorrhage after TLH is unknown. We may hypothesize that the application of thermal energy to tissues may cause more tissue necrosis and devascularization than sharp culdotomy in abdominal and vaginal hysterectomies. Treatment of secondary hemorrhage through the vaginal approach in the form of packing, suturing, and drainage of hematoma appears to be feasible as an initial intervention to control bleeding. In addition, care must be taken while performing TLH in large uteri and limiting the overly enthusiastic use of thermal energy. TLH is still recommended over abdominal hysterectomy because of the obvious advantages.[10–12]

The limitation of this study is that it is a retrospective observational study. Further prospective randomized controlled trials are needed to validate our results.

CONCLUSION

Our data suggest that secondary hemorrhage is rare but may occur more often after TLH than after other hysterectomy approaches. The comparison of different energy sources such as ultrasonic or bipolar methods with scissors for culdotomy in TLH is worth studying. A large uterus size, excessive use of an energy source for the uterine artery, and culdotomy may play a role.

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